

DOCKET NO.: MSFT-0219/147298.1
Application No.: 09/783,787
Office Action Dated: October 1, 2003

**PATENT
REPLY FILED UNDER EXPEDITED
PROCEDURE PURSUANT TO
37 CFR § 1.116**

REMARKS/ARGUMENTS

Claims 1-40 are pending in this application. Claims 1-40 have been rejected as follows: claims 1-4, 11, 12, 17-20, 24-26, 28, and 31 have been rejected under 35 U.S.C. § 102(e) as being anticipated by Matsumoto (U.S. Patent No. 6,480,971); claims 32, 33, 35, and 40 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Blickenstaff (U.S. Patent No. 5,537,585); claims 5-10, 13-16, 21-23, 27, 29-30, 34, 36-40 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over various combinations of Matsumoto, Blickenstaff, Yamamoto (U.S. Patent No. 6,493,787), and Kaneko (U.S. Patent No. 5,802,020), as proposed by the Examiner in paragraphs 9-17 of the Office Action.

In response to a prior Office Action (mailed March 18, 2003, hereinafter "Office Action I"), applicants explained in detail why claims 1-40 are patentable over the prior art. In paragraph 4 of the current Office Action (mailed October 1, 2003, hereinafter "Office Action II"), the Examiner purports to respond to applicants' arguments and continues to assert that the claims are unpatentable over the prior art. Applicants respectfully submit that the Examiner has misread the prior art, and that the additional portions of the references cited by the Examiner still do not teach or suggest the features recited in the claims. Applicants have demonstrated below why the claims define over the references cited, even in view of the Examiner's new explanation of the prior art.

SUMMARY OF THE PRESENT APPLICATION AND THE PRIOR ART

The present application is directed to systems and methods for migrating data (e.g., old files) to secondary media (e.g., tapes, optical disks, etc.). The invention supports the

migration of data to secondary media by managing the use of the media in a way that takes into account the availability of resources used in the migration process, as well as the need to migrate the data in a way that supports efficient recall of the migrated data in the future. For example, in selecting media to which to migrate data, the systems and methods of the invention may take into account such factors as: whether a given medium is double-sided, whether the first side of a double-sided medium is full, whether a given medium is currently in use, the amount of time that it takes for an in-use medium to become available, whether a given medium is robotically accessible, the amount of time that it will take to mount a non-robotically accessible medium, and the number of drives that are concurrently available for writing. (See Application, pages 21-30 and FIGS. 7-9.) As disclosed in the application, media may be classified based on the above-described factors, and then a medium may be selected based on which classification the medium falls into. (See Application, Table 1 at p. 25, lines 1-17.) When a medium has been selected according to factors such as those mentioned above, then data may be migrated to the selected medium.

The following is a brief summary of the prior art that the Examiner has applied to the claims of the present application.

Matsumoto

Matsumoto is directed to the use of optical disks in a "data striping" process. Data striping is a process that breaks up serial data so that it can be recorded and recalled on multiple media that can be written and read simultaneously. (See Matsumoto, col. 1, ll. 16-67.) Matsumoto is addressed to a particular problem that arises when optical disks are used in a data striping scheme: optical disks may have defects, and data that cannot be written to a

defective portion is written to a substitute sector; when the substitute sector is filled, it is no longer possible to write data to the disk, even if the disk has additional free space. Thus, if one disk's substitute sector fills up, the entire data striping process must be halted or suspended. (See Matsumoto, col. 2, l. 45 through col. 3, l. 4.) Matsumoto addresses this problem by allowing other regions of a disk to supplement the space provided by the substitute sector. Thus, the effective capacity of the substitute sector is increased, making it less likely that a disk will become unusable during the process of data striping. (Matsumoto, col. 4, ll. 18-23.)

Blickenstaff

Blickenstaff is directed to the management of data storage in a networked environment. Blickenstaff describes a data storage management system comprising a plurality of virtual file subsystems. (Blickenstaff, col. 2, l. 22-24.) Blickenstaff describes paradigms to decide which files should be migrated from primary storage to secondary storage (col. 2, ll. 61-67). Additionally, the storage management system is organized in layers, and files are migrated from layer to layer depending on such factors as their activity level, content, and the amount of available storage space within a given layer (col. 3, ll. 1-6).

Yamamoto

Yamamoto is directed to a method of accessing plate shaped memories (e.g., compact discs). Yamamoto addresses the problem of allowing successive plate-shaped memories to be continuously accessed. Thus, if a song is stored across two different discs, a listener would hear a gap in the song while one disc is dismounted and the other disk is mounted (col. 1, ll.

48-57). Yamamoto notes that the prior art allows music to be reproduced continuously in the above-described disc-change situation, by means of buffering the end of the first disk (and reproducing the music out of the buffer) while the disk is being changed (col. 1, ll. 58-65). Yamamoto purports to provide system whereby music recorded across two disks can be reproduced without the use of a buffer, and without interruption (col. 2, ll. 57-59).

Kaneko

Kaneko is directed to a device for recording and playback of optical disks. Kaneko's device includes a magazine that holds a plurality of optical disks, and a conveyor unit that extracts optical disks from the magazine and inserts the extracted disk into an optical disk drive. (Kaneko, col. 7, ll. 10-25).

Patentability of Claims 1-40 Over the Prior Art

Paragraphs 5-17 of Office Action II appear to restate the same grounds for rejection that are set forth in Office Action I. Since applicants have already responded to those grounds for rejection in the response filed on July 16, 2003 (hereinafter "the July 16, 2003 paper"), applicants incorporate the July 16, 2003 response and will not repeat the substance of that response here. However, as to the new grounds for rejection set forth in paragraph 4 of Office Action II, applicant responds as follows:

Claim 1

The Examiner asserts that Matsumoto anticipates claim 1. As part of the rejection of claim 1, the Examiner has found that Matsumoto teaches the features of "designating an additional one of said plurality of media as being in the writable state," and causing "the

aggregate number of media in the writeable state [to exceed] said concurrency value,” as recited in claim 1. The Examiner notes that, in one of Matsumoto’s examples, six media can be used simultaneously in a data striping process, and the Examiner appears to find that these six media correspond to a “concurrency value.”

Even if Matsumoto’s use of six media simultaneously constitutes a “concurrency value” (and applicants do not agree with that position), claim 1 does not merely call for a “concurrency value,” but also calls for the number of media in the writeable state to exceed the concurrency value, which occurs when an additional medium is designated as writeable. Matsumoto does not teach these feature, because in Matsumoto the number of media that are used in the data striping process is fixed, so there is no opportunity for an additional medium to be designated as writeable. Matsumoto does not designate and “additional” medium as writeable, or cause the number of media to “exceed” any particular number, because the number of media that Matsumoto uses for data striping is always the same.

Thus, Matsumoto does not teach or suggest the features of claim 1, and claim 1 defines over Matsumoto.

Claim 4

Claim 4 recites that there is a “device” that has a library of media and a robotic mechanism that mounts media from the library onto the drives. Additionally, claim 4 calls for a determination that “none of said plurality of media located outside of said device is in the writeable state.” With regard to these features, the Examiner cites column 3, ll. 25-28 and column 4, ll. 39-51 of Matsumoto for its teaching of a library apparatus. Even if Matsumoto’s library mechanism could be considered “device” defined in claim 4, Matsumoto does not

teach or suggest the features of claim 4, since Matsumoto says nothing about media that are located outside of the library apparatus.

Moreover, claim 4 calls for a determination that none of the media located within the device has sufficient space to store data. Matsumoto does not address the problem of media that have run out of space, but rather the problem of media whose substitute sectors have run out of space. Matsumoto's substitute sectors are not the same as the claimed media; at a minimum, claim 4 calls for media to be robotically mountable, and it is not possible to mount (robotically or otherwise) an individual sector of a disk.

Thus, applicants respectfully submit that Matsumoto does not anticipate claim 4.

Claim 12

The features recited in claim 12 include: (1) "determining that each of the media in said set is in use for the reading or writing of data"; (2) "waiting for a medium from said set to become available"; and (3) "determining that the number of said plurality of media in the writeable state is greater than or equal to a first number." The Examiner's citations with regard to these features relate to "management information regions." However, Matsumoto's discussion of "management information regions" does not teach the claimed features.

In particular, with regard to features (1) and (2), the cited portions of Matsumoto mention that it can be determined, between two management information regions, which one contains the latest data. However, determining which management region contains the latest data has nothing to do with determining whether media are "in use for the reading or writing of data." Nor does this discussion have anything to do with "waiting ... for a medium to become available."

With regard to feature (3) (i.e., “determining that the number of ... media in the writeable state is greater than or equal to a first number.”), the cited portion of Matsumoto teaches comparing two counter values stored in two different management information regions. However, comparing two counter values has nothing to do with the claimed feature. The number of media in the writeable state is not a “counter value”; nor is the “first number.” Nor are the claimed quantities stored in “management information regions.”

Thus, Matsumoto does not teach or suggest the features of claim 12, and does not anticipate claim 12.

Claims 17 and 18

Claims 17 and 18 recite that there is a device that has a library of media and a robotic mechanism that mounts media located in the library onto the drives. Furthermore, claim 17 recites “determining that none of the media located in said library is in the writeable state,” and claim 18 recites “determining that none of said plurality of media located outside of said device is in the writeable state.”

As discussed above in connection with claim 4, even if Matsumoto’s library apparatus could be considered to teach the claimed “device” that has a robotic mechanism and a library, Matsumoto says nothing about media being located inside or outside of such a device, or determining that such media are not in the writeable state.

Thus, Matsumoto does not teach or suggest the features of claim 4, and does not anticipate claim 4.

Claim 20

Claim 20 has been rejected under section 102(e) as being anticipated by Matsumoto. Claim 20 calls for various features that are clearly not taught by Matsumoto.

In particular, claim 20 calls for: (1) “determining that each of said media in [a] first set is in use for the reading or writing of data,”; and (2) “identifying a first one of said plurality of media which is not in use for the reading or writing of data, and which has a first side that is in the non-writeable state and a second side whose state is not designated”.

There is no analogy to these features in Matsumoto. The Examiner has cited Matsumoto’s teachings with regard to management information regions and the labeling of sectors as teaching these features; however, these teachings from Matsumoto have nothing to do with the claimed features. Contrary to the Examiner’s assertion, determining whether a first or second management region contains the latest data has nothing to do with whether any media in a “first set” are in use for the reading or writing of data (as recited in feature (1)). Moreover, the notion that a sector of a disk may be labeled based on a combination of the sector number and disk number has nothing to do with media that are not in use, double-sided media having a side in the writeable state, or media having an undesignated side (as recited in feature (2)). (The portion of Matsumoto that the Examiner cites as teaching teaches that the 81st sector on the 4th disk can be labeled “481”; this has nothing to do with feature (2)).

Thus, Matsumoto does not teach or suggest the features of claim 20, and does not anticipate claim 20.

Additionally, in discussing claim 20, however, the Examiner questions whether claim 20 has been amended. Claim 20 has not been amended. The bracketed material quoted by the Examiner (which appears in applicants’ discussion of claim 20 in the July 16, 2003 paper) is

merely an informal description of the “first set” recited in claim 20. Since the “first set” is characterized in a portion of claim 20 that was not quoted by applicants, applicants provided the description for the Examiner’s convenience, so that the Examiner would not have to refer to the text of claim 20 in order to understand the general meaning of “first set.” The bracketed material should not be regarded as an amendment to the claim, or otherwise limiting of the claim.

Claim 25

Claim 25 has been rejected under section 102(e) as being anticipated by Matsumoto. Claim 25 recites the feature of “identifying a second medium, said second medium not being designated as being in either the writeable state or the non-writeable state.” Matsumoto does not teach this feature. In particular, Matsumoto does not teach that a medium can exist in a state where it has not been designated as being either writeable or non-writeable.

With regard to the above-quoted feature, the Examiner has cited Matsumoto’s teachings that if “data has not been appropriately written, an affirmative ... determination is made ... and if there is an empty, i.e., available, area in the substitute sector region in the medium ... the processing proceeds ... to write the data into the substitute sector region.” (See Office Action II, p. 18.) Additionally, the Examiner cites Matsumoto’s discussion of “failed” media, the insertion of media into devices, and volume identifiers. None of these feature – or any other part of Matsumoto – teach or suggest that are in neither the writeable nor the non-writeable state, as recited in claim 25.

Thus, Matsumoto does not teach or suggest the features of claim 25, and does not anticipate claim 25.

Claim 26

Claim 26 has been rejected under section 102(e) as being anticipated by Matsumoto. Claim 26 recites the feature of “waiting for [a] first medium to become available prior to writing said data to said first medium.” The Examiner has read this feature (see Office Action II, p. 19-20) onto Matsumoto’s teachings regarding the act of disconnecting a media drive from its controller. However, disconnecting a media drive has nothing to do with waiting for a medium to become available.

In Matsumoto, there is no “wait” for a medium. As discussed above, Matsumoto teaches the concurrent use of media in a data striping process. All media are mounted and written simultaneously. There is no need to “wait” for a medium to become available.

Thus, Matsumoto does not teach or suggest the features of claim 26, and does not anticipate claim 26.

Claim 32

Claim 32 stands rejected as being anticipated by Blickenstaff. Claim 32 recites “a media management module [that includes] logic which selects said media based on a concurrency value.” Blickenstaff does not teach the use of a concurrency value. As discussed above, Blickenstaff relates to a “virtual file system.” There is no teaching or suggestion in Blickenstaff that media can be selected based on any particular value. In particular, there is no suggestion in Blickenstaff that a media could be selected based on the number of jobs that can be performed concurrently, or based on any other quantity related to concurrency.

With regard to the Examiner's suggestion that the term "concurrency value" is not explained in the application, applicants direct the Examiner's attention to page 15 of the Application, which discusses this concept at length.

Thus, Blickenstaff does not teach or suggest the features of claim 32, and does not anticipate claim 32.

Claim 39

Claim 39 has been rejected under section 102(b) as being anticipated by Blickenstaff. Claim 39 recites the existence of a device that has a library of media and a robotic mechanism that mounts media from the library onto the drives, and further recites "logic which selects a medium based on which of said plurality of media is located in the library." Blickenstaff does not teach or suggest this feature.

Initially, it should be noted that the Examiner has not addressed the above-quoted feature in either the current Office Action, or in the previous Office Action. Thus, the Examiner has not demonstrated how Blickenstaff teaches all of the features of claim 39. However, applicants note that Blickenstaff does not teach this feature. Blickenstaff, at best, mentions a device that includes "magnetic tape drives and robotic media storage and retrieval library systems" (col. 6, ll. 53-54). Blickenstaff contain no teaching that a medium is selected based on which media are in the library.

Thus, Blickenstaff does not teach or suggest the features of claim 39, and does not anticipate claim 39.

Claim 40

Claim 40 has been rejected under section 102(b) as being anticipated by Blickenstaff.

Claim 40 recites:

- “first data storage means for storing attributes of said media, said attributes including ... whether each medium is double-sided, and whether each medium is robotically accessible”;
- “second data storage means for storing concurrency information”; and
- “media management means for choosing a medium to which to write ... based on said attributes and said concurrency information”.

In other words, claim 40 requires that a medium on which to write is selected based on: (1) concurrency information, and (2) attributes indicating whether: (a) whether the medium is double-sided, and (b) whether the medium is robotically accessible. Blickenstaff does not teach the selection of media based on *any* of these factors.

As discussed above in connection with claim 32, Blickenstaff does not teach a concurrency value, and does not teach that media are selected based on anything having to do with concurrency. The portion of Blickenstaff cited by the Examiner (see Office Action II, p. 25) refers to the selection of *data files to be migrated to media*, and does not mention the selection of *media*. While the cited portion of Blickenstaff mentions the word “concurrently,” this portion describes “concurrently operational ... rules,” which have nothing to do with selecting media based on concurrency information; this phrase simply means that two rules (which relate to the selection of files, not the selection of media) can both be applied at the same time. However, the fact that two rules can be concurrently operational does not mean that “concurrency information” is stored. While claim 40 and the quoted passage from

Blickenstaff both use forms of the word “concurrent,” this superficial similarity is not sufficient to sustain a finding of anticipation, since the substance of claim 40 and Blickenstaff are markedly different.

Additionally, claim 40 calls for media to be selected based on whether a given medium is double-sided, and whether the medium is robotically accessible. The Examiner has cited column 6, lines 53-54 of Blickenstaff, which mentions the existence of a “robotic media storage and retrieval library system.” However, Blickenstaff says nothing about selecting a medium based on whether the medium is robotically accessible. Blickenstaff’s mere mention of the fact that robotic systems exist is not the same as selecting a medium based on whether the medium is robotically accessible. Moreover, Blickenstaff says nothing about selecting a medium based on whether the medium is double-sided.

Thus, Blickenstaff does not teach or suggest the features of claim 40, and does not anticipate claim 40.

Claims 5-6, 8-10, 13-16, 21-23, 27, 29, 30, 34, and 36-38

The Examiner states that he disagrees with applicants arguments concerning claims 5-6, 8-10, 13-16, 21-23, 27, 29, 30, 34, and 36-38 (see Office Action II, p. 7). Although the Examiner does not explain the basis for this disagreement, the Examiner notes that these claims are dependent claims, and states that the grounds for rejection of independent claims 1, 12, 20, 25, 32, and 40 are “applicable to the dependent claims” (Office Action, p. 7). The Examiner suggests that he will not provided a claim-by-claim discussion of these dependent claims because he should not “involve a lot of energy and time for things that are not central to the invention, but peripheral” (Office Action II, p. 8).

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Applicants do not regard the dependent claims as “peripheral,” and applicants note that in the July 16, 2003 paper they provided specific arguments as to the patentability of claims 5, 23, 29, and 38. The Examiner has not responded to these arguments. Applicants maintain that claims 5, 23, 29, and 38 are patentable over the prior art for the reasons advanced in the July 16, 2003 paper.

Response to Interview Summary

On January 6, 2004, the undersigned telephoned the Examiner to clarify whether the October 1, 2003 Office Action is final or non-final. The undersigned pointed out that the action states in one place that it is final, and in another place that it is non-final. The Examiner called the undersigned on January 7, 2004 and indicated that the action would be treated as final. The Examiner has since provided an interview summary, which appears to reflect this discussion accurately.

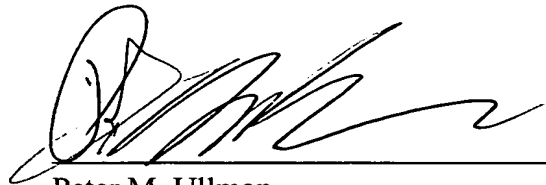
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Conclusion

For the reasons set forth above, the claims of the present application are patentable over the prior art of record. All of the independent claims have been shown to be patentable, and all of the dependent claims are patentable at least by reason of their dependency. Thus, this case is in condition for allowance, and applicants request that the Examiner issue a Notice of Allowance in the next action.

Date: March 31, 2001

A handwritten signature in black ink, appearing to read 'P. M. Ullman', is written over a horizontal line.

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